Nos. 22-1972, 22-1973, 22-1975, 22-1976

United States Court of Appeals for the Federal Circuit

MASIMO CORPORATION,

Appellant,

v.

APPLE INC.,

Appellee.

APPEAL FROM THE UNITED STATES PATENT AND TRADEMARK OFFICE, PATENT TRIAL AND APPEAL BOARD IN NOS. IPR2020-01713, IPR2020-01716, IPR2020-01733, IPR2020-01737

APPLE'S RESPONSE BRIEF

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February 21, 2023

Attorneys for Appellee Apple Inc.

Representative Claim 1 of U.S. Patent No. 10,702,194:

1. A physiological measurement system comprising:
a physiological sensor device comprising:
one or more emitters configured to emit light into tissue of a user;
a first set of photodiodes, wherein:
the first set of photodiodes comprises at least four photodiodes,
the photodiodes of the first set of photodiodes are connected to one another in parallel to provide a first signal stream, and
each of the photodiodes of the first set of photodiodes has a corresponding window that allows light to pass through to the photodiode;
a second set of photodiodes, wherein:
the second set of photodiodes comprises at least four photodiodes,
the photodiodes of the second set of photodiodes are connected to one another in parallel to provide a second signal stream, and
each of the photodiodes of the second set of photodiodes has a corresponding window that allows light to pass through to the photodiode;
a wall that surrounds at least the first and second sets of photodiodes; and
a cover comprising a protruding convex surface, wherein the protruding convex surface is above all of the photodiodes of the first and second sets of photodiodes, wherein at least a portion of the protruding convex surface is rigid, and wherein the cover is above the wall; and
a handheld computing device in wireless communication with the physiological sensor device, wherein the handheld computing device comprises:
one or more processors configured to wirelessly receive one or more signals from the physiological sensor device, the one or more signals responsive to at least a physiological parameter of the user;
a touch-screen display configured to provide a user interface, wherein:
the user interface is configured to display indicia responsive to measurements of the physiological parameter, and
an orientation of the user interface is configurable responsive to a user input; and
a storage device configured to at least temporarily store at least the measurements of the physiological parameter.
Appx514.

CERTIFICATE OF INTEREST

Counsel for Appellee Apple Inc. ("Apple") certifies the following:

1. Provide the full names of all entities represented by undersigned counsel in this case.

   Apple Inc.

2. Provide the full names of all real parties in interest for the entities. Do not list the real parties if they are the same as the entities.

   Apple Inc.

3. Provide the full names of all parent corporations for the entities and all publicly held companies that own 10% or more stock in the entities.

   None

4. List all law firms, partners, and associates that (a) appeared for the entities in the originating court or agency or (b) are expected to appear in this court for the entities. Do not include those who have already entered an appearance in this court. Fed. Cir. R. 47.4(a)(4).

   Fish & Richardson P.C.: Andrew B. Patrick, Usman Khan, Hyun Jin In, Daniel D. Smith, Robert J. Devoto

5. Provide the case titles and numbers of any case known to be pending in this court or any other court or agency that will directly affect or be directly affected by this court's decision in the pending appeal. Do not include the originating case number(s) for this case. Fed. Cir. R. 47.4(a)(5). See also Fed. Cir. R. 47.5(b).

   Masimo Corporation, et al. v. Apple Inc.,
   Case No. 8:20-cv-00048 (C.D. Cal.)

   Certain Light-Based Physiological Measurement Devices and Components Thereof
   Case No. 337-TA-1276 (ITC)

   Masimo Corp. v. Apple Inc.,
   Case Nos. 22-1631, -1632, -1633, -1634, -1635, -1636, -1637, -1638 (Fed. Cir.)

***Masimo Corp. v. Apple Inc.*,**
Case Nos. 22-2069, -2070, -2071, -2072 (Fed. Cir.)

6. Provide any information required under Fed. R. App. P. 26.1(b) (organizational victims in criminal cases) and 26.1(c) (bankruptcy case debtors and trustees). Fed. Cir. R. 47.4(a)(6).

None

Dated: February 21, 2023

/s/ Lauren A. Degnan
Lauren A. Degnan

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STATEMENT OF RELATED CASES

Pursuant to Federal Circuit Rule 47.5, the undersigned counsel states that no other appeal from the same *inter partes* review ("IPR") was previously before this or any other appellate court. The undersigned counsel is aware of the following pending cases that will directly affect or be directly affected by this Court's decision in the pending appeal:

- *Masimo Corporation v. Apple Inc.*, Case Nos. 22-1631, -1632, -1633, -1634, -1635, -1636, -1637, -1638 (Fed. Cir.)
- *Masimo Corporation v. Apple Inc.*, Case Nos. 22-2069, -2070, -2071, -2072 (Fed. Cir.)
- *Masimo Corporation, et al. v. Apple Inc.*, Case No. 8:20-cv-48-JVS (C.D. Cal.)

RESPONSIVE STATEMENT OF THE ISSUES

Whether substantial evidence supports the Board's conclusion that the challenged claims would have been obvious to a person of ordinary skill in the art ("POSITA") based on certain combinations of references.

INTRODUCTION

In four detailed Final Written Decisions, the Board thoroughly considered Masimo's arguments and carefully weighed the evidence, ultimately finding every challenged claim of the Masimo patents at issue unpatentable. On appeal, Masimo would have this Court reconsider countless of the Board's fact-bound findings concerning the interpretation of the prior art and a POSITA's background knowledge and motivations. However, the prior art, Apple's expert testimony, and other evidence constitute substantial evidence supporting the Board's findings. Although Masimo may disagree with those findings, this Court is not the venue for relitigating these myriad fact-specific issues. Substantial evidence supports the Board's decisions, which is all this Court needs to affirm as to every challenged claim.

RESPONSIVE STATEMENT OF THE CASE

I. MASIMO'S PATENTS

This appeal concerns four Masimo patents sharing a common specification: U.S. Patent Nos. 10,624,564; 10,702,194; 10,702,195; and 10,709,366. These Masimo patents describe data collection systems including noninvasive sensors that communicate with patient monitors. *See* Appx389 (2:47-51).[1] The sensors measure blood constituents or analytes (e.g., oxygen or glucose), or other

[1] In this section, Apple provides representative citations to the '564 patent.

physiological characteristics such as pulse rate. *See id.* (2:38-51). The sensors include a housing, an optical source, and several photodetectors. *See* Appx389-390 (2:38-46, 3:4-6). The patient monitor includes a display and a network interface for communicating with a handheld computing device. *See* Appx389 (2:54-57).

Figure 1 illustrates an exemplary data collection system:

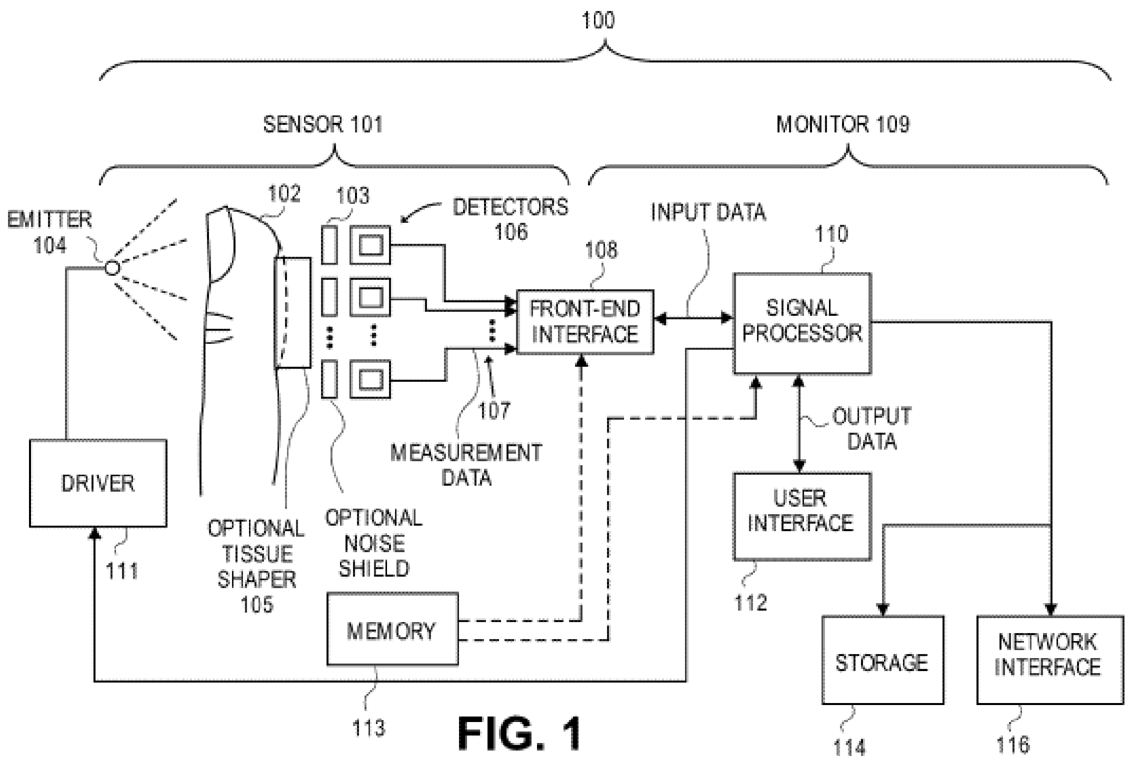


FIG. 1

Appx324. Figure 1's data collection system includes a sensor 101 and monitor 109. Appx394 (11:56-67). The sensor 101 includes an emitter 104 and detectors 106. *See id.* (12:1-5). The emitter 104 emits light that is attenuated or reflected by the patient's tissue at measurement site 102, then detectors 106 capture and measure the light attenuated or reflected from the tissue. Appx395 (14:11-16).

The sensor 101 also may include a tissue shaper 105, which may be in many alternative forms, including a convex, concave, or flat surface. Appx394 (11:7-23). The monitor 109 includes a signal processor 110 and user interface 112. Appx396 (15:27-29). The signal processor 110 determines measurements for blood analytes based on the signals it receives. *See id.* (15:32-35). The user interface 112 presents the measurements to a user on a display. *See id.* (15:57-61).

The specification describes sandwiching a finger between the shells of the device, similar to a conventional pulse oximeter. *See* Appx397. Figure 3C depicts a sensor, comprising an upper emitter shell connected to a lower detector shell. *See* Appx397 (18:43-51). The emitter shell houses emitter components (*e.g.*, LEDs), and the detector shell houses photodetectors. Figures 4A through 4C illustrate embodiments of a protrusion that may be part of the data collection system:

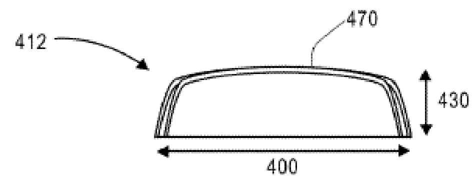


FIG. 4B

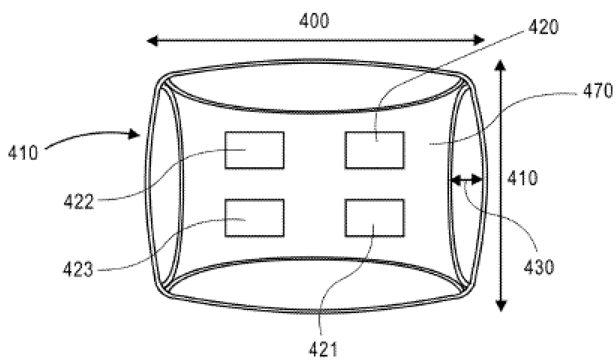


FIG. 4A

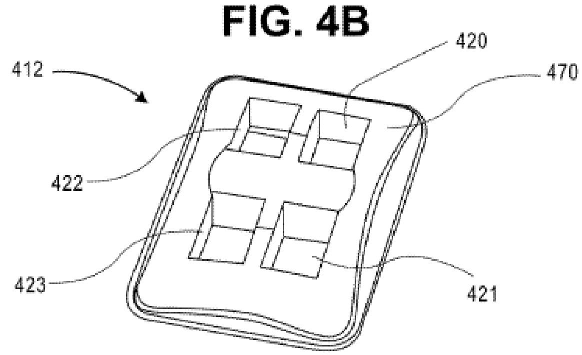


FIG. 4C

Appx335. In these embodiments, the protrusion includes a measurement site contact area 470, which "can be generally curved and/or convex with respect to the measurement site[.]" Appx400 (23:51-60). Figure 14D depicts another detector subassembly, in which multiple detectors 1410c are located under a transparent cover 1432 and protrusion 605b. Appx406 (36:33-51).

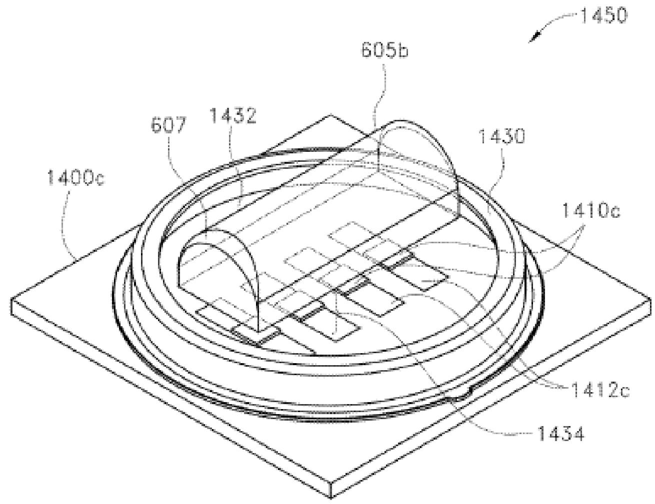


FIG. 14D

Appx361. Protrusion 605b's light-focusing properties may reduce the number of detectors required. *Id.* (35:62-36:11).

Claim 1 of the '194 patent is illustrative:

1. A physiological measurement system comprising:
a physiological sensor device comprising:
one or more emitters configured to emit light into tissue of a user;
a first set of photodiodes, wherein:
the first set of photodiodes comprises at least four photodiodes,
the photodiodes of the first set of photodiodes are connected to one another in parallel to provide a first signal stream, and
each of the photodiodes of the first set of photodiodes has a corresponding window that allows light to pass through to the photodiode;
a second set of photodiodes, wherein:
the second set of photodiodes comprises at least four photodiodes,
the photodiodes of the second set of photodiodes are connected to one another in parallel to provide a second signal stream, and
each of the photodiodes of the second set of photodiodes has a corresponding window that allows light to pass through to the photodiode;
a wall that surrounds at least the first and second sets of photodiodes; and

a cover comprising a protruding convex surface, wherein the protruding convex surface is above all of the photodiodes of the first and second sets of photodiodes, wherein at least a portion of the protruding convex surface is rigid, and wherein the cover is above the wall; and

a handheld computing device in wireless communication with the physiological sensor device, wherein the handheld computing device comprises:

one or more processors configured to wirelessly receive one or more signals from the physiological sensor device, the one or more signals responsive to at least a physiological parameter of the user;

a touch-screen display configured to provide a user interface, wherein:

the user interface is configured to display indicia responsive to measurements of the physiological parameter, and

an orientation of the user interface is configurable responsive to a user input; and

a storage device configured to at least temporarily store at least the measurements of the physiological parameter.

Appx514.

II. THE CLAIMED FEATURES WERE KNOWN IN THE PRIOR ART

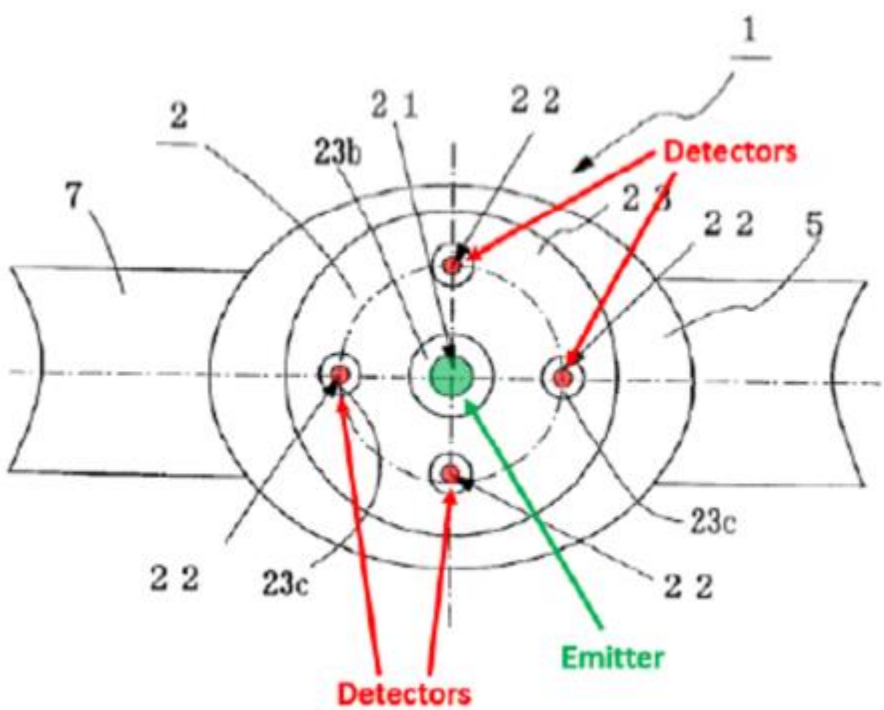
The Board relied on multiple combinations of prior art references to cancel the challenged claims. Three references are at issue in this appeal: Aizawa (Appx2488-2494), Ohsaki (Appx2542-2547), and Mendelson-2003 (Appx10229-10232).[2]

A. Aizawa

Aizawa is a U.S. patent application publication titled "Pulse Wave Sensor and Pulse Rate Detector." It discloses a wrist-worn sensor, which detects pulse

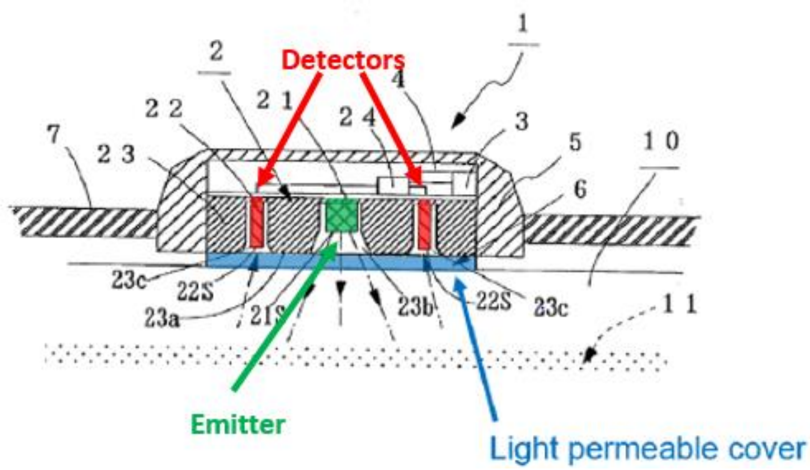
[2] Although other references were part of the obviousness combinations before the Board, Masimo limits its arguments on appeal to issues concerning Aizawa, Ohsaki, and Mendelson-2003.

rate based on light output from a light emitting diode and reflected from a patient's artery. Appx2492-2493. Figure 1A depicts a pulse wave sensor:



Appx2489 (annotations added); *see also* Appx2493 (¶23). The pulse wave sensor includes an LED 21 (green), four photodetectors 22 (red) symmetrically distributed around the LED, and a "holder" 23 for storing these components. Aizawa discloses that increasing the number of photodetectors may improve detection efficiency. *Id.* (¶32); Appx2491 (Fig. 4(a)). Aizawa also describes obtaining the "same effect" in the opposite configuration, *i.e.*, one photodetector surrounded by multiple LEDs. Appx2493-2494 (¶33).

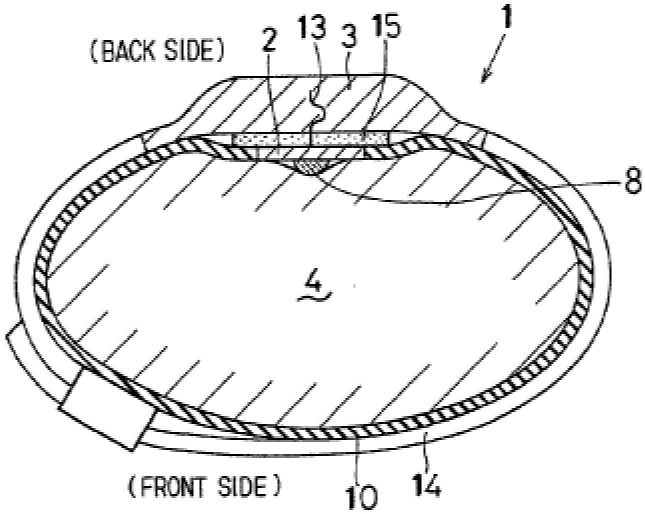
Figure 1B illustrates a cross-sectional view of Figure 1A's sensor:



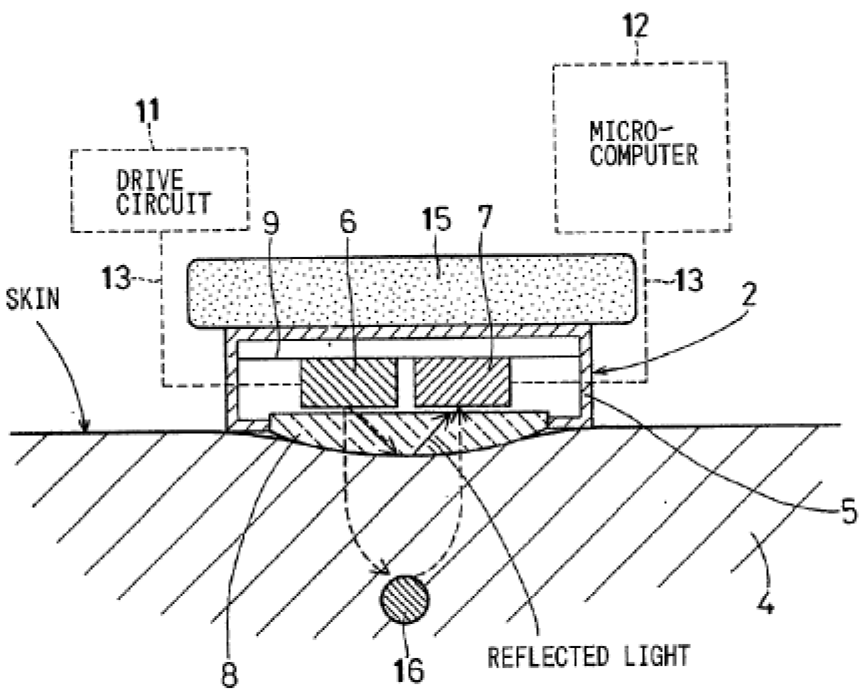
Appx2489 (annotations added); *see also* Appx2493 (¶23). The LED and photodetectors "are stored in cavities 23b and 23c." Appx2493 (¶24). A detection face 23a contacts the user's wrist. *Id.* The belt 7 "is fastened such that the acrylic transparent plate 6 becomes close to the artery 11 of the wrist," improving adhesion between the wrist and pulse rate detector. *Id.* (¶26); *see also* Appx2494 (¶34).

B. Ohsaki

Ohsaki is a U.S. patent application publication titled "Wristwatch-type Human Pulse Wave Sensor Attached on Back Side of User's Wrist." It discloses an optical sensor for detecting a pulse wave of a human body. Appx2542 (Title); Appx2545 (¶3). Figure 1 illustrates a pulse wave sensor 1 wrapped around a user's wrist 4:



Appx2543; *see also* Appx2545 (¶16). The pulse wave sensor 1 includes a detecting element 2 and sensor body 3. *Id*. Figure 2 illustrates a mechanism for detecting a pulse wave:

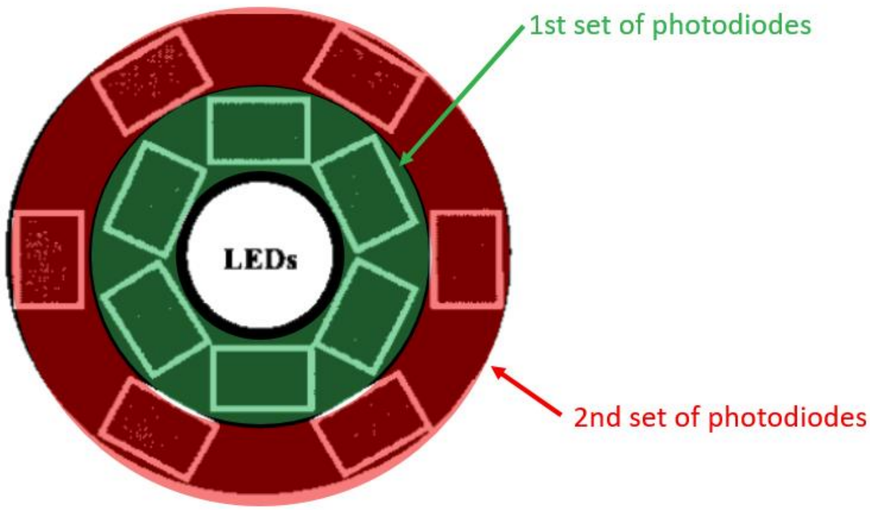


Appx2543; *see also* Appx2545 (¶13). The detecting element includes a light-emitting element 6, light-receiving element 7, and translucent board 8.

Appx2545 (¶17). "A convex surface is formed on the top of the translucent board 8." *Id*. The translucent board's convex shape puts it "in intimate contact with the surface of the user's skin," preventing the detecting element from slipping off the desired position on the wrist. Appx2546 (¶25). By preventing slippage, this convex surface suppresses "variation of the amount of the reflected light . . . reflected by the surface of the user's skin." *Id.* Additionally, the convex surface prevents penetration by "disturbance light from the outside." *Id.*

C. Mendelson-2003

Mendelson-2003 is an article titled "Measurement Site and Photodetector Size Considerations in Optimizing Power Consumption of a Wearable Reflectance Pulse Oximeter." It discloses a wearable pulse oximeter which uses a "reflectance sensor comprising twelve identical Silicon PD ["photodiode"] chips[.]" Appx10230 (3017). As depicted below, Mendelson-2003 describes six photodiodes in an inner ring, and a second set of six photodiodes in an outer ring. *Id.*



Id. (Fig. 1) (annotations added). Mendelson-2003 teaches that each set of photodiodes "were wired in parallel and connected through a central hub to the common summing input of a current-to-voltage converter." *Id.* (3017). Arranging two rings of detectors in this manner can save power "by widening the active area of the PD which helps to collect a bigger portion of backscattered light intensity." Appx10232 (3019). This configuration of PDs further allows for a decrease in the current provided to the LED because a lower brightness LED would still produce an acceptable signal as a result of the increased light collection efficiency of the PD configuration. *See* Appx10230 (3017 ("[M]inimizing the drive currents supplied to the LEDs would contribute considerably toward the overall power saving in the design of a more efficient pulse oximeter, particularly in wearable wireless applications.")).

Mendelson-2003 also teaches that its sensor can be worn on the wrist. *Id.* (3017). By using the two sets of photodiodes that are each connected in parallel, backscattered signals measured from the wrist increased significantly. Appx10232 (3019). Thus, the above-described 2-ring PD arrangement can allow power-sensitive wearable devices, such as wrist-based devices, to consume less power, thereby prolonging battery life. *See* Appx10230 (3017).

III. THE BOARD'S DETERMINATION THAT THE CHALLENGED CLAIMS ARE UNPATENTABLE

Across all four of the Board's Final Written Decisions, no challenged claims survived. The following table illustrates the outcome of each IPR:

IPR (Patent)	Claims Shown Unpatentable (Grounds)
IPR1713 ('564)	• 1-10, 13-30 ○ (Aizawa, Ohsaki, Goldsmith) ○ (Aizawa, Ohsaki, Goldsmith, Ali) • 11 ○ (Aizawa, Ohsaki, Goldsmith, Sherman) ○ (Aizawa, Ohsaki, Goldsmith, Ali, Sherman) • 12 ○ (Aizawa, Ohsaki, Goldsmith, Rantala) ○ (Aizawa, Ohsaki, Goldsmith, Ali, Rantala)
IPR1716 ('194)	• 1-18, 20, 22-30 (Aizawa, Mendelson-2003, Ohsaki, Mendelson-2006) • 19, 21 (Aizawa, Mendelson-2003, Ohsaki, Mendelson-2006, Beyer)
IPR1733 ('195)	• 1-17 (Aizawa, Mendelson-2003, Ohsaki, Goldsmith)
IPR1737 ('366)	• 1-12, 14-27 (Aizawa, Mendelson-2003, Ohsaki, Goldsmith) • 13 (Aizawa, Mendelson-2003, Ohsaki, Goldsmith, Sherman)

In IPR1733, Apple also challenged claims 1-17 under Section 103 with references Aizawa, Mendelson-2003, Ohsaki, Goldsmith, and Ali. Appx230. Because the Board concluded these claims were unpatentable on other grounds, it did not reach the merits of that ground. *Id.*

Masimo's arguments on appeal primarily center on whether a POSITA would have been motivated to combine certain subsets of the references above. In each decision, the Board relied extensively on the references themselves and testimony from Apple's expert, Dr. Thomas Kenny, an esteemed Professor at the Department of Mechanical Engineering at Stanford University. *See, e.g.*, Apx2333 (¶6); Appx2365-2373 (¶¶66-74) (Dr. Kenny's first declaration in IPR1713 discussing combination of Aizawa and Ohsaki); Appx3591-3625 (¶¶7-66) (Dr. Kenny's second declaration in IPR1713 discussing combination of Aizawa and Ohsaki); Appx8512-8517 (¶¶66-74) (Dr. Kenny's first declaration in IPR1716 discussing combination of Aizawa and Mendelson-2003); Appx8517-8523 (¶¶75-83) (Dr. Kenny's first declaration in IPR1716 discussing combination of Aizawa, Mendelson-2003, and Ohsaki); Appx12034-12070 (¶¶7-71) (Dr. Kenny's second declaration in IPR1716 discussing combination of Aizawa and Ohsaki).[3]

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[3] Dr. Kenny submitted similar declarations in each group of IPRs. *See, e.g.*, Appx15936-15941, Appx15941-15947 (excerpts from Dr. Kenny's first declaration in IPR1733); Appx17722-17756 (excerpts from Dr. Kenny's second declaration in IPR1733); Appx21974-21985, Appx21985-21992 (excerpts from Dr. Kenny's first declaration in IPR1737); Appx23528-23562 (excerpts from Dr. Kenny's second declaration in IPR1737).

A. The Board's Decisions Combining Aizawa and Mendelson-2003

In IPR1716, IPR1733, and IPR1737, the Board found that a POSITA would have been motivated to combine Aizawa and Mendelson-2003. Appx107-114; Appx188-196; Appx264-271. Based on the references themselves and Dr. Kenny's expert testimony, the Board found that a POSITA would have found it obvious to add a second set of detectors in Aizawa's sensor, as taught by Mendelson-2003, for the benefit of stronger signals with reduced power consumption. Appx108. The Board credited Dr. Kenny's testimony in two respects in reaching its conclusion.

First, the Board credited Dr. Kenny's testimony that using a sensor with ***dual*** detector rings (as taught by Mendelson-2003) to improve a sensor with ***one*** detector ring (as taught by Aizawa) "would have led to predictable results without significantly altering or hindering the functions performed by Aizawa's sensor." *See, e.g.*, Appx8516-8517 (¶74). This result is particularly predictable given that Aizawa itself discloses adding extra detectors to improve light collection efficiency. *Id*.

Second, the Board credited Dr. Kenny's testimony that a POSITA would have found it obvious to connect each set of photodetectors in parallel to provide first and second signal streams. Appx108 (citing Appx8516-8517 (¶74); Appx8529-8530 (¶¶93-94); Appx8537 (¶102)). Dr. Kenny testified that this

configuration would have led to predictable results including numerous advantages "such as monitoring for displacement, accounting for motion artifacts, and compensating for the relative decrease in light that reaches the outer ring, which cannot be achieved with a single signal stream." Appx108-109 (citing Appx8530-8533 (¶¶95-97)).

B. The Board's Decisions Combining Aizawa and Ohsaki

In IPR1713, IPR1716, IPR1733, and IPR1737, the Board found that a POSITA would have been motivated to add the convex protrusion in Ohsaki to Aizawa's sensor. Appx35-50; Appx129-143; Appx208-222; Appx285-300. Combining Aizawa with Ohsaki would improve adhesion between the sensor and the user's tissue, thereby improving signal strength and detection efficiency, Appx36-49; Appx129-141; Appx208-221; Appx286-299, while also protecting sensor elements, Appx49-50; Appx142; Appx221-222; Appx299-300.

SUMMARY OF THE ARGUMENT

The Court should reject Masimo's fact-bound challenges to the Board's thorough decisions. Masimo disputes that a POSITA would have been motivated to combine the references at issue, but motivation to combine is a question of fact, and the Board's decisions are supported by substantial evidence.

Substantial evidence supports the Board's factual finding that it would have been obvious to a POSITA to include a second ring of detectors to Aizawa's

sensor, as taught by Mendelson-2003, to achieve stronger signals and reduced power consumption. Aizawa teaches a first set of detectors arranged in a circle around an emitter and also teaches ways to improve detection efficiency. Because, as Aizawa indicates, a POSITA would have been motivated to improve detection efficiency, it follows that a POSITA would have turned to Mendelson-2003's dual-ring configuration. Mendelson-2003's dual-ring configuration allows additional light to be captured, resulting in stronger signals, reduced power consumption, and longer battery life.

Substantial evidence also supports the Board's factual finding that Ohsaki would have motivated a POSITA to add a protrusion to Aizawa's sensor to improve adhesion and help prevent slippage, thereby improving signal strength and detection efficiency. Ohsaki itself states that its convex surface is "in intimate contact with the surface of the user's skin," preventing the detecting element from slipping off the user's wrist. Appx2546 (¶25). A POSITA would have been motivated to apply Ohsaki's convex cover to Aizawa to improve Aizawa's ability to resist movement of the sensor on the user's wrist and to suppress signal variation. As the Board recognized, Ohsaki teaches that improved adhesion results in suppressed variation in the signals reaching the detectors, reduction in noise, and accordingly better detection of the pulse wave. Substantial evidence supports the

Board's finding that this set of improved results could apply on either side of the wrist.

Certain claims at issue across three IPRs recite specific protrusion height ranges for the convex cover of greater than 1 or 2 millimeters and less than 3 millimeters. Although no reference expressly discloses these ranges, substantial evidence supports the Board's finding that only a finite number of solutions existed with respect to the height of a convex protrusion on a tissue-facing sensor. The Board relied on Apple's expert testimony that a device designed to fit on a user's wrist would be on the order of millimeters. Given the required scale, the Board credited expert testimony that the specifically-recited ranges would have been obvious.

Masimo's substantive rebuttals on these issues all suffer the same fatal flaw—in each instance, the Board found Apple's expert testimony more credible than Masimo's. But this Court does not reweigh factual findings, including the weight afforded to expert testimony regarding motivation to combine. The Board's decision is supported by substantial evidence, including this expert testimony, and should therefore be affirmed. Finally, although reversal is certainly not warranted, it is also not possible for IPR1733 because the Board did not reach additional grounds Apple presented in its petition; at a minimum, therefore, the IPR1733 decision would have to be remanded.

ARGUMENT

I. STANDARD OF REVIEW

Masimo's arguments on appeal relate to factual determinations on which this Court must defer to the Board and apply the substantial evidence standard. "The presence or absence of a motivation to combine references in an obviousness determination is a pure question of fact." *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1366-67 (Fed. Cir. 2016) (internal quotations omitted).

Substantial evidence is "such relevant evidence as a reasonable mind might accept as adequate to support a conclusion." *Universal Camera Corp. v. NLRB*, 340 U.S. 474, 477 (1951) (internal quotations omitted). It is defined as "something less than the weight of the evidence but more than a mere scintilla of evidence, meaning that it is such relevant evidence as a reasonable mind might accept as adequate to support a conclusion." *Monsanto Tech. LLC v. E.I. DuPont de Nemours & Co.*, 878 F.3d 1336, 1341 (Fed. Cir. 2018) (internal quotations omitted). Thus, even "[i]f two inconsistent conclusions may reasonably be drawn from the evidence in record, the PTAB's decision to favor one conclusion over the other is the epitome of a decision that must be sustained upon review for substantial evidence." *Id.* (internal quotations omitted).

II. SUBSTANTIAL EVIDENCE SUPPORTS THE BOARD'S MOTIVATION TO COMBINE FINDINGS

Despite substantial evidence supporting the Board's findings, Masimo now asks this Court to re-weigh the evidence, which it should decline to do. *In re NTP, Inc.*, 654 F.3d 1279, 1292 (Fed. Cir. 2011) ("This court does not reweigh evidence on appeal, but rather determines whether substantial evidence supports the Board's fact findings.").

A. Substantial Evidence Supports the Board's Findings Concerning Combining Aizawa with Mendelson-2003 [IPR1716, IPR1733, IPR1737][4]

1. Substantial Evidence Supports the Board's Finding that a POSITA Would Have Been Motivated To Have Two Rings of Detectors

a. Expert Testimony and Mendelson-2003's Express Teachings Show that Adding an Outer Ring of Detectors to Aizawa Would Improve Light Collection and Reduce Power Consumption

Substantial evidence supports the Board's factual finding that a POSITA "would have found it obvious to include a second set of detectors in Aizawa's sensor, as taught by Mendelson-2003," to achieve stronger signals and reduced power consumption. Appx108; *see generally* Appx107-114.

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[4] The Board's analysis of this issue appears at Appx107-114 (IPR1716); Appx188-196 (IPR1733); and Appx264-271 (IPR1737). In this section, Apple provides representative citations to IPR1716.

As the Board recognized, Aizawa teaches a first set of photodiodes in the form of four photodetectors 22 that are arranged in a circle around an emitter. Appx107 (citing Appx2493 (¶23)). Although Aizawa does not expressly teach "a second set of photodiodes [that] are connected to one another in parallel to provide a second signal stream" as recited in claim 1 of the '194 patent, it does teach various ways of using a single ring of multiple detectors to improve detection efficiency, such as increasing the number of detectors to eight. *See* Appx2492-2493 (¶¶13, 30, 32); Appx2491 (Fig. 4a); *see also* Appx8513 (¶68). Mendelson-2003 teaches using two rings of photodiodes/detectors in a wrist-based application where each ring includes six detectors. Appx10230. The Board recognized that Mendelson-2003 also teaches that its dual-ring configuration allows additional light to be captured, resulting in stronger signals, reduced power consumption, and longer battery life. Appx107-108 (citing Appx10232).

In finding that a POSITA would have found it obvious to add a second set of detectors in Aizawa's four-photodetector sensor, as taught by Mendelson-2003, the Board credited Dr. Kenny's testimony that the known solution of using a sensor with dual detector rings would have led to predictable results when applied to Aizawa's sensor with one detector ring, "especially where Aizawa itself discloses adding extra detectors to improve light collection efficiency." Appx108 (citing Appx8516-8517 (¶74)).

Masimo argues on appeal, as it did before the Board, that the combination of Aizawa and Mendelson-2003, which keeps Aizawa's first set of four detectors in a near ring and adds a second set of detectors in a far ring, would reduce signal strength and increase power consumption. Op.Br. 26-29. But it is Masimo, not the Board, that misreads Mendelson-2003. Although utilizing ***only*** the far ring of detectors results in reduced signal amplitude and reduced battery life, Mendelson-2003 plainly indicates that utilizing ***both*** a far ring and a near ring of detectors increases both signal amplitude and battery life:

PD CONFIGURATION	BATTERY LIFE [Days]
Near	45.8
Far	20.3
Near+Far	52.5

Appx10232 (Table 1 showing better battery life for the "Near+Far" detector combination than near detectors alone); *see also* Appx10231 (Fig. 3 indicating the combination of near and far detectors had the highest signal amplitude). The Board correctly found that Mendelson-2003's Table 1 contradicts Masimo's argument. Appx112-113. The Board therefore correctly rejected Masimo's arguments regarding whether Aizawa's detector arrangement is "limited" to a single ring of detectors. *See* Appx107-114; Op.Br. at 28-29, 35-36.

b. Masimo's Arguments Mischaracterize the Board's Findings and Dr. Kenny's Testimony

Masimo attempts to avoid this straightforward conclusion by mischaracterizing the combination Apple proposed and the Board adopted as involving "moving" Aizawa's detectors away from the center. Op.Br. 2, 24, 27-30. That is false; the combination is "***adding*** an additional ring of detectors" to Aizawa.[5] Appx6883-6885; *see also* Appx112-113 (the Board correctly analyzing what would happen "if a second ring of detectors were ***added*** to Aizawa's sensor").

To the extent Masimo is suggesting (*e.g.*, at 26-27) that Apple needed to show that adding an additional ring of detectors (as illustrated in the petition, *e.g.*, at Appx6883) would have been preferable to adding more detectors to Aizawa's existing ring (*e.g.*, as Aizawa illustrates in Figure 4(a), *see* Appx2491), Masimo's argument is without merit. First, the argument rests on a false dichotomy that a skilled artisan could add detectors in only one location, not both. To the extent a skilled artisan was starting from Aizawa's eight-detector embodiment, rather than its four-detector embodiment as shown in Apple's petition, Dr. Kenny's testimony and the Board's findings equally establish that it would have been obvious to add additional detectors in a second ring to that embodiment as well. Appx107-113; Appx8512-8517 (¶¶66-74).

[5] All emphasis is added unless noted otherwise.

Second, it is sufficient for obviousness that the proposed combination improves on Aizawa's four-detector embodiment. *See In re Fulton*, 391 F.3d 1195, 1200 (Fed. Cir. 2004) ("[O]ur case law does not require that a particular combination must be the preferred, or most desirable, combination described in the prior art in order to provide a motivation for the current invention."); *In re Gurley*, 27 F.3d 551, 552-53 (Fed. Cir. 1994). Even if adding more detectors to a single ring had benefits beyond those achieved by adding a second ring, "[t]he fact that the motivating benefit comes at the expense of another benefit . . . should not nullify its use as a basis to modify the disclosure of one reference with the teachings of another." *Winner Int'l Royalty Corp. v. Wang*, 202 F.3d 1340, 1349 n.8 (Fed. Cir. 2000); *see also Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1165 (Fed. Cir. 2006) ("[A] given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine."). The Board credited Dr. Kenny's testimony that a second ring of detectors connected in parallel would have unique benefits beyond those afforded by adding detectors to a single ring. Appx108-109; Appx113-114; Appx8529-8533 (¶¶94-97). That constitutes substantial evidence supporting the Board's factual findings on motivation to combine.

c. Masimo's Arguments Concerning Dr. Kenny's Alleged Admissions Rely on the Same Mischaracterization

Masimo relatedly argues that Apple's expert testimony "that a POSITA motivated by the desire for better power consumption would have moved Aizawa's

detectors ***closer*** to the centrally located emitter" undermines the Board's decision. Op.Br. 29. But as discussed above, the combination is adding detectors, not moving them, Appx112-113; Appx6883-6885, and adding a second ring of detectors would have been beneficial and obvious regardless of how many detectors are added closer to the center. Appx107-113; Appx8512-8517 (¶¶66-74).

In its proper context, Apple's expert testimony actually supports, rather than undermines, the Board's decisions. *See, e.g.*, Appx14295-14301 (97:12-103:12). Although Dr. Kenny recognized in his deposition that "there's more signal available in the region close to the center versus out at the end," Appx14298 (100:19-20), he also testified there were multiple, non-exclusive modifications a POSITA could make that would result in system benefits, including adding detectors to a second ring. Appx14299-14300 (101:8-102:4).

Masimo argues that "the Board's proposal to 'compensat[e]' for the problems created by its modification to Aizawa's sensor—including by adding an amplifier—would . . . merely attempt to amplify a weakened signal created by the Board's flawed combination and restore that signal to the same level as the detectors in Aizawa's single ring." Op.Br. 33. Although Dr. Kenny offered the option of compensating for the relative decrease in light that reaches the outer ring, he did not concede that such compensation is always necessary. Appx8532-8533 ((¶97) ("To ensure that the pulse rate data provided by the outer ring is preserved

when combined with the pulse rate data provided by the inner ring, a POSITA would have found it obvious, ***in some implementations***, to keep each ring separately wired and connected to its own amplifier (i.e., drive detection circuit 24) to thereby keep the magnitude of the current signals provided by each ring approximately the same before being combined and transmitted to the arithmetic circuit 3.")). But even if the second ring signals are amplified to match the magnitude of the first ring signals, Dr. Kenny explained, "[t]he second ring gives you the opportunity to capture more signal." Appx14301 (103:3-5). Regardless of how many detectors are present in a single, inner ring, there will always be additional light that can be captured by adding a second, outer ring, thus enhancing the system's efficiency. *E.g.*, Appx12066-12067 (¶¶64-66). The Board thus properly understood Dr. Kenny's testimony as supporting its obviousness finding. Appx111-113.

2. Substantial Evidence Supports the Board's Findings Regarding the Advantages of Parallel-Connected Detectors

Substantial evidence also supports the Board's factual finding that connecting the photodetectors of each set (the inner ring and outer ring) in parallel to provide first and second signal streams would have been obvious. Appx107-109. The Board's findings are well supported by Dr. Kenny's testimony and Mendelson-2003's explicit disclosure. *E.g.*, Appx8516-8517 (¶74); Appx8529-8533 (¶¶93-97); Appx8537 (¶102); Appx10230. Masimo does not dispute that

Mendelson-2003 explicitly discloses that each of its two rings are "***wired in parallel*** and connected through a central hub to the common summing input of a current-to-voltage converter." Appx10230; *see also* Op.Br. 18. How Aizawa's detectors are connected is immaterial—Mendelson-2003's disclosure alone is dispositive because obviousness does not require showing a motivation to retain claim elements "already present together in a reference." *Gen. Elec. Co. v. Raytheon Techs. Corp.*, 983 F.3d 1334, 1352 (Fed. Cir. 2020).

Yet, even if a motivation to retain Mendelson-2003's parallel connections were required, the Board properly found that parallel connections have numerous advantages, "such as monitoring for displacement, accounting for motion artifacts, and compensating for the relative decrease in light that reaches the outer ring, which cannot be achieved with a single signal stream." Appx108-109 (citing Appx8530-8533 (¶¶95-97)). This evidence, including the references themselves along with Dr. Kenny's testimony, constitutes substantial evidence supporting the Board's findings.

None of Masimo's various quibbles with the Board's findings and Dr. Kenny's testimony changes the fundamental facts that (1) the Board, as factfinder, was entitled to credit Dr. Kenny and (2) his opinions are substantial evidence supporting the Board's conclusions. It is immaterial that Aizawa and Mendelson-2003 do not expressly discuss the benefits of separate parallel connections. *Contra*

Op.Br. 31. A "motivation to combine does not have to be explicitly stated in the prior art, and can be supported by testimony of an expert witness regarding knowledge of a" skilled artisan. *PAR Pharm., Inc. v. TWI Pharms., Inc.*, 773 F.3d 1186, 1197 (Fed. Cir. 2014).

Masimo's criticisms of Dr. Kenny's discussion of Mendelson-799 also provide no basis for disturbing the Board's factual findings. Op.Br. at 31-32; *see also* Appx108-109 (citing Appx8530-8533 (¶¶95-97)). Dr. Kenny used Mendelson-799 for the limited purpose of showing reasons why a skilled artisan would not—as Masimo suggested—combine "all the signals from [all] the detectors into a single stream." Appx8530-8531 (¶95).[6] Dr. Kenny did not admit that his analysis of Mendelson-799's benefits was flawed. Instead, Dr. Kenny acknowledged that Mendelson-799's photodetectors are measured individually rather than being wired in parallel, but testified that "one of ordinary skill in the art is aware that it's possible to combine the signals from arrays of photodetectors in various ways, including wiring them in parallel or processing them separately." Appx14316 (118:2-15). He further explained that "it would be obvious that there

[6] The law is clear that evidence not within the particular asserted grounds for invalidity, such as Mendelson-799, "can be relied on for [its] proper supporting roles, e.g., indicating the level of ordinary skill in the art, what certain terms would mean to one with ordinary skill in the art, and how one with ordinary skill in the art would have under-stood a prior art disclosure." *Yeda Rsch. v. Mylan Pharms. Inc.*, 906 F.3d 1031, 1041 (Fed. Cir. 2018) (quoting *Dominion Dealer Sols., LLC v. AutoAlert, Inc.*, IPR2014-00684, 2014 WL 5035359, at *5 (P.T.A.B. Oct. 6, 2014)).

would be a similar benefit" to wiring the rings in parallel, yet "separately." Appx14317-14318 (119:6-120:3). In any event, Dr. Kenny discussed other benefits from wiring each ring in parallel that were independent of his discussion of Mendelson-799, which the Board also credited. *E.g.*, Appx8531-8533 (¶¶96-97); *see also* Appx108-109. Substantial evidence thus supports the Board's findings.

Finally, Masimo implies that Mendelson-2003 teaches away from the claims by arguing that—despite connecting the near ring and far ring in parallel for its experiments—Mendelson-2003 teaches that "a sensor design for physiological monitoring benefits from using ***one*** combined signal stream from ***all*** detectors." Op.Br. at 34-35 (original emphases). However, a prior art reference does not teach away merely by describing other alternatives that have their own benefits. *Fulton*, 391 F.3d at 1201. Indeed, even a reference that "expresses a general preference" does not teach away if it does not "criticize, discredit, or otherwise discourage investigation into the claimed invention." *Meiresonne v. Google, Inc.*, 849 F.3d 1379, 1382 (Fed. Cir. 2017) (quotation marks omitted). Thus, even if Mendelson-2003 could be read as touting the benefits of a single combined signal stream (which Apple does not concede), Masimo has not established any teaching away.

Further, Dr. Kenny's testimony that there are "multiple benefits to separately transmitting signal streams from the near and far detectors—as opposed to combining all the signals from the detectors into a single stream," including monitoring for displacement, accounting for motion artifacts, and adjusting for the

amount of light that reaches the outer ring, provides sufficient support for the Board's findings regardless of Masimo's arguments about Mendelson-2003. Appx107-108; Appx8530-8533 (¶¶95-97). Despite Masimo's argument (at 35) that "Mendelson-2003 provides no teachings that suggest its power testing system setup would be useful in a working physiological monitor," a motivation to combine need not be expressly taught ***in the references themselves***. *E.g.*, *Brown & Williamson Tobacco Corp. v. Philip Morris Inc.*, 229 F.3d 1120, 1125 (Fed. Cir. 2000) ("[T]he suggestion to combine need not be express and may come from the prior art, as filtered through the knowledge of [a POSITA]." (internal quotations omitted)).

For the foregoing reasons, this Court should affirm the Board's findings concerning the combination of Aizawa and Mendelson-2003.

* * *

The remaining issues Masimo raises in this appeal do not materially differ from those already briefed in Appeal No. 22-1631 (consol.).[7] For completeness and to direct the Court to the corresponding portions of the record for the IPRs at issue in these appeals, Apple addresses these arguments again here.

* * *

[7] One difference is the Board's decision not to address all of grounds in Apple's IPR1733 petition because it concluded the challenged claims were unpatentable on other grounds. Appx230. As discussed below, this issue prevents the Court from reversing the Board's decision in IPR1733.

B. Substantial Evidence Supports the Board's Finding that Ohsaki Would Have Motivated a POSITA To Add a Convex Protrusion to Aizawa [IPR1713, IPR1716, IPR1733, IPR1737]

Substantial evidence supports the Board's factual finding that Ohsaki would have motivated a POSITA to add a protrusion to Aizawa's sensor to improve adhesion and help prevent slippage, thereby improving signal strength and detection efficiency. *E.g.*, Appx36 ("The evidence of record persuades us that adding a convex cover, such as that taught by Ohsaki, would have improved adhesion between the sensor and the user's skin, which would have increased the signal strength of the sensor.").[8]

As the Board recognized, Ohsaki itself states that its convex surface is "in intimate contact with the surface of the user's skin," preventing the detecting element from slipping off the user's wrist. Appx36 (quoting Appx2546 (¶25)). The Board credited Dr. Kenny's testimony that a POSITA "would have been motivated by such teachings to apply a cover with a convex surface to Aizawa to improve that similar device in the same way and to yield predictable results, i.e., to resist movement of the sensor on the user's wrist and to suppress variation." Appx36 (citing Appx2367-2368 (¶68)). It also credited Dr. Kenny's opinion that a POSITA "would have understood that a protruding convex cover would reduce the

[8] The Board's analysis of this issue appears at Appx36-49 (IPR1713); Appx129-141 (IPR1716); Appx208-221 (IPR1733); Appx286-299 (IPR1737). In this section, Apple provides representative citations to IPR1713.

adverse effects of user movement on signals obtainable by photodetectors which are positioned to detect light reflected from user tissue." Appx3595 (¶13).

1. Substantial Evidence Supports the Board's Finding that the Combination of Aizawa and Ohsaki Improves Adhesion

Masimo's challenges to the Board's finding that the combination could work with a sensor on either the wrist's front (palm) side or its back side disregard the proper standard of review. *E.g.*, Op.Br. at 49-56. The Board properly rejected Masimo's argument that Apple should be limited to the location of Aizawa's sensor (on the wrist's palm side) because Apple's combination does not propose bodily incorporation of Ohsaki's protrusion into Aizawa's device. Appx42-44; *see also In re Keller*, 642 F.2d 413, 425 (CCPA 1981). Substantial evidence supports the Board's decision to reject Masimo's demand to restrict the sensor's location.

Instead, the Board properly credited Dr. Kenny's opinion that "a convex protrusion will help prevent slippage" on either side of the wrist. Appx43-44 (citing Appx3592-3594 ¶¶10-11); Appx3601-3605 (¶¶24-30). Dr. Kenny explained that Ohsaki's convex protrusion "would have increased adhesion and reduced slippage of Aizawa's sensor when placed on either side of a user's wrist or forearm." Appx12046-12047 (¶¶29-30). The Board recognized that Figures 3A and 3B of Ohsaki "show better performance when the element is attached to the back side of the wrist versus the front side of the wrist, when the user is in motion." Appx43 (citing Appx2546 (¶¶23-24); Appx2544 (Figs. 3A-3B)).

However, Ohsaki also acknowledges that, even when the detecting element is located "on the front [palm] side of the user's wrist 4, the pulse wave can be detected well if the user is at rest." Appx43 (citing Appx2546 (¶23). The Board thus properly exercised its fact-finding role to find that "Ohsaki discloses that, in at least some circumstances, a convex surface located on the front of the user's wrist achieves benefits." *Id.*

Finally, contrary to Masimo's assertion (at 54-55), the Board did not develop its own theory concerning adhesion. Although Masimo is correct that Aizawa's ***flat*** plate itself improves adhesion, the Board found it does so because of the acrylic material of plate 6, not the shape of the surface of the plate. Appx44 (citing Appx2493-2494 (¶¶30, 34)). The Board was not developing a new obviousness theory, but simply explaining why it declined to give weight to Dr. Madisetti's testimony. Appx44. The Board is permitted—indeed, required—to ascertain when an expert's testimony contradicts the plain teaching of a reference. *Apple Inc. v. MPH Techs. Oy*, 28 F.4th 254, 262 (Fed. Cir. 2022) ("The Board [i]s free to reject [an] expert's testimony based on a lack of factual support.").

Accordingly, Masimo's highly factual wrist-location arguments provide no basis to overturn the Board's motivation-to-combine findings.

2. Improved Adhesion Increases Signal Strength and Detection Efficiency

a. Apple Did Not Waive or Forfeit the "Additional Light-Capture" Theory

As a threshold issue, Masimo argues that the "additional light-capture" theory adopted by the Board was a "new" theory not included in Apple's petitions. Op.Br. at 40-41. The Board did not abuse its discretion in considering this theory—the Board already addressed Masimo's waiver-based argument and concluded that the Petition discloses adding a convex protrusion to Aizawa to increase the light gathering ability of Aizawa's device. *See* Appx1233-1237.

Because the Patent Owner Response challenged that contention, *see* Appx1561-1567, it opened the door for Apple to provide arguments and evidence in rebuttal. *See* PTAB Consolidated Trial Practice Guide (Nov. 2019) ("Consolidated Guide"), 73 ("A party also may submit rebuttal evidence in support of its reply."). Nothing changed about Apple's theory of obviousness; rather, the Reply presents more argument and evidence supporting the same obviousness theory from the Petition. *Compare* Appx1233-1237, *with* Appx1614-1626. Expansion of an already-disclosed theory is permissible, particularly where it directly responds to arguments raised by the other party. Appx48-49; *Provisur Techs., Inc. v. Weber, Inc.*, 50 F.4th 117, 122-23 (Fed. Cir. 2022) ("By concluding that [Petitioner]'s reply evidence properly rebutted [Patent Owner]'s arguments the

Board necessarily also determined that Weber didn't have to submit the evidence with its petition."); *Chamberlain Grp., Inc. v. One World Techs., Inc.*, 944 F.3d 919, 925 (Fed. Cir. 2019) ("Parties are not barred from elaborating on their arguments on issues previously raised.").

b. Substantial Evidence Supports the Board's Finding of Increased Signal Strength and Improved Detection Efficiency

Substantial evidence supports the Board's finding that the improved adhesion from incorporating a protrusion on Aizawa's sensor would have "increased the signal strength of the sensor." Appx36. In describing the relationship between improved adhesion, increased signal strength, and improved detection efficiency, the Board found that Ohsaki teaches that improved adhesion results in suppressed variation in the signals reaching the detectors, reduction in noise, and accordingly better detection of the pulse wave. Appx36-37 (citing Appx2546 (¶¶25, 27)); *see also id.* (¶27) (noting the sensor "can provide high detection probability" due to the detecting element's being "stably fixed").[9] The Board also credited Dr. Kenny's testimony that a POSITA would have been motivated by these teachings to "apply a cover with a convex surface to Aizawa to

[9] In addition to Ohsaki's teachings, Dr. Kenny's testimony establishes a relationship between "signal strength" and "detection efficiency": a convex surface increases the strength of signals that can be detected by Ohsaki's sensor. *See, e.g.*, Appx2367-2369 (¶¶68-69) (citing, e.g., Appx2546 (Ohsaki) (¶25)).

improve that similar device in the same way and to yield predictable results, i.e., . . . to suppress variation" in the signals detected by the sensor, thereby improving signal strength. Appx36 (citing Appx2367-2368 (¶68); Appx2369-2370 (¶70); Appx2395-2396 (¶103)).

The Board further found that, "when emitted light passes through user tissue, the light diffuses and scatters as it travels" such that adding a convex cover to Aizawa's sensor (which has multiple detectors symmetrically arranged about a central light source) would allow those scattered light rays to be directed toward the detection area as they pass through the convex cover, thus increasing the light-gathering ability of Aizawa's sensor. Appx45-47 (citing Appx1623; Appx1668; Appx3613-3615 (¶¶46-49)). The Board concluded that the "light thus travels at random angles and directions, and no longer travels in a collimated and perpendicular manner." *Id.* The Board relied on an Optics textbook, as well as Dr. Kenny's testimony, to visualize incoming collimated light reflecting from a rough surface, in which the reflected light rays travel in random directions. Appx45-46 (citing Appx3716-3717; Appx3613 (¶46)). The Board credited Dr. Kenny's testimony that, in Aizawa, the sensor detects light that has been "partially reflected, transmitted, absorbed, and scattered by the skin and other tissues and the blood before it reaches the detector." Appx46-47 (citing Appx3613 (¶46)). The Optics

textbook and Dr. Kenny's expert testimony constitute substantial evidence supporting the Board's decision.

Finally, Masimo argues (at 46-47) that "[t]he Board identified no evidence explaining why a POSITA would have disregarded Aizawa's specific disclosure to use a flat plate for improved detection efficiency." However, the Board did explain that "Ohsaki expressly compares the performance of a wrist-worn pulse wave sensor depending on whether translucent board 8 is convex or flat, and concludes the convex surface results in improved performance over the flat surface, especially when the user is moving." Appx37; *see also* Appx41 ("[W]e agree with Petitioner that Ohsaki's teaching of a convex surface would have motivated a person of ordinary skill in the art to add such a surface to Aizawa's sensor, to improve signal strength, as taught by Ohsaki.").

c. Substantial Evidence Supports the Board's Finding that Masimo's Expert Testimony Focused on Only Collimated Light

The Board properly rejected Masimo's arguments that a convex cover would condense light toward the center of Aizawa's sensor, away from the periphery where the detectors are placed. Appx47. Instead, the Board found that Masimo's expert testimony focused on only the behavior of collimated and perpendicular light, whereas the light in the combined system of Aizawa and Ohsaki would be approaching the sensor from various angles after being reflected by tissue. Appx47 (citing Appx5338-5344 (¶¶80-82, 84-88)).

Masimo argues on appeal that its expert's testimony was not limited to just collimated and perpendicular light. Op.Br. at 43. But the Board implicitly rejected Dr. Madisetti's testimony to the contrary, and Masimo asks this Court to re-weigh that finding. In context, Dr. Madisetti was discussing Figure 14B, which is reproduced below.

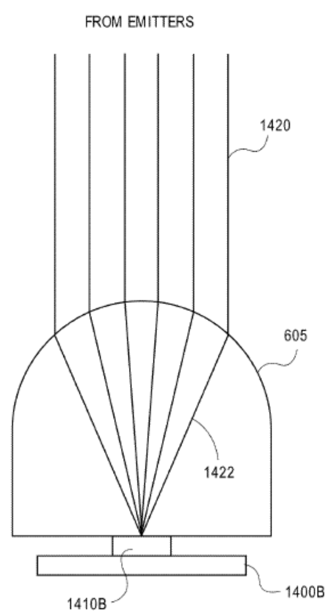


FIG. 14B

Appx359. Masimo cites Dr. Madisetti's testimony that "a POSA, viewing Figure 14B in the context of the specification, would understand that it represents light from the measurement site that could include all kinds of light, including collimated or diffused light." Appx4511 (57:8-13); *see also* Op.Br. 44. But when asked whether the light rays in Figure 14B were collimated, Dr. Madisetti refused to answer, instead repeating the same response regardless of the question posed or

further elaboration requested: "All I can say is that a POSA viewing Figure 14B and the disclosures in the text of the specification and also the disclosures in the prior art asserted, asserted that this is consistent with redirecting or condensing light towards the center." Appx4510-4512 (56:9-58:17), Appx4518-4523 (64:14-69:10).

The Board implicitly rejected Dr. Madisetti's testimony on this point when it explained that Dr. Madisetti's testimony was focused on only collimated and perpendicular light. Appx47. Moreover, Dr. Kenny testified that the incoming light in Fig. 14B is collimated, in contrast to diffuse light backscattered from the measurement site. Appx3616-3617 (¶ 52); *see also* Appx45-47. Accepting Masimo's invitation to have this Court re-analyze and re-weigh the evidence would be wholly improper, as "it is not for [the Court] to second-guess the Board's assessment of the evidence," but rather "to determine whether substantial evidence supports the conclusion chosen by the Board." *Velander v. Garner*, 348 F.3d 1359, 1378-79 (Fed. Cir. 2003); *see also Monsanto Tech. LLC*, 878 F.3d at 1341 ("If two inconsistent conclusions may reasonably be drawn from the evidence in record, the PTAB's decision to favor one conclusion over the other is the epitome of a decision that must be sustained upon review for substantial evidence." (internal quotations omitted)). In any event, the Board is not required "to address every argument raised by a party or explain every possible reason supporting its

conclusion,'" *Novartis AG v. Torrent Pharms.*, 853 F.3d 1316, 1328 (Fed. Cir. 2017) (internal quotation omitted).

d. The Board Considered and Rejected Masimo's Arguments Regarding Apple's Alleged Admissions

The Board also considered Masimo's argument that, in a different petition filed against a related patent (IPR2020-01520), "Petitioner and Dr. Kenny both admit that a convex cover condenses light towards the center of the sensor and away from the periphery." Appx47 (quoting Appx1562-1564; Appx5338-5340 (¶¶80-83)). Dr. Kenny's testimony is entirely consistent, as the Board acknowledged. Appx48 ("We do not agree that this discussion is inconsistent . . . ."). In IPR2020-01520, Dr. Kenny's testimony discussed a decrease in the "mean path length" of a ray of light when it travels through a convex lens rather than through a flat surface. Appx47-48 (citing Ex. 2020 (¶¶118-120)). Here, however, Dr. Kenny testified that, where light is reflected to the detectors at various random angles and directions, the convex cover will help more light reach Aizawa's detectors because light that might have otherwise missed the detectors now will be captured. Appx48 (citing Appx3614-3615 (¶49); Appx3618-3619 (¶55)). This testimony constitutes substantial evidence to support the Board's findings.

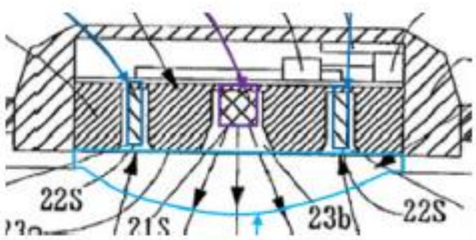
Masimo would have this Court disregard the Board's findings on this issue because the Board also found "that the convergence of a ***single*** ray of light toward

the center" does not "speak[] to the aggregate effect on all light that travels through the convex surface." Appx48. Masimo faults the Board for this analysis because claim language addressed by Dr. Kenny requires that "the light permeable cover is configured to reduce a ***mean path length*** of light traveling to the at least four detectors." Op.Br. at 38 (citing Appx6525). But Dr. Kenny's ***testimony*** was not so limited; instead, it was generally applicable to "the light passing through" Aizawa's modified cover. Appx6525-6527 (¶¶119-120); Appx13183-13184 (197:11-198:16) (testifying that the illustrated example was a "***representative*** example" and that "if I repeated this analysis for a multitude of path lengths, I would find that the majority of them would have a shorter path length"). Thus the Board's substantive point still stands—a reduction in mean path length does not speak to the aggregate effect on all light that travels through the convex surface, particularly when that light is scattered at random angles and directions.

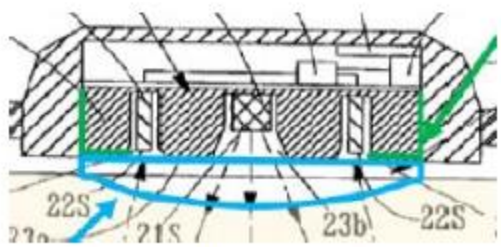
Masimo argues that "[t]he Board never explained how a POSITA would balance the loss of refracted-away light rays against some additional light capture benefit." Op.Br. 42. But the Board implicitly credited Dr. Kenny's testimony that striking this balance would have been within the skill set of a POSITA, who would understand that "where light is reflected to the detectors at various random angles and directions, more light will reach Aizawa's symmetrically disposed detectors when travelling through the convex surface than would be reached without such a

surface, because light that might have otherwise missed the detectors now will be captured." Appx48 (citing Appx3614-3615 (¶49), Appx3618-3619 (¶55)). Thus, the Board's "'path may reasonably be discerned,'" which is sufficient to "'uphold [its] decision.'" *See, e.g.*, *Yeda Rsch.*, 906 F.3d at 1047 (quoting *In re NuVasive*, 842 F.3d 1376, 1383 (Fed. Cir. 2016)).

Masimo also argues the Board's alleged failure to address the issue is "particularly problematic because . . . Apple significantly varied the shape of its convex surface from its petition to reply in the same IPR proceedings." Op.Br. 42. Masimo includes the following image in its brief as illustrating the alleged change to the convex surface:



Apple's Large Convex Surface in Petition in IPR1713 (Appx01237)



Apple's Small Convex Surface in Reply in IPR1713 (Appx01605)

Op.Br. 42. This minor change in how Apple illustrated the combination is not "significantly varied"; both bear a remarkable resemblance to Ohsaki itself. *See* Appx2543 (Fig. 2). The alleged change in figures makes no difference in any event. Just as patent figures "are not drawn to scale unless otherwise indicated," *Hockerson-Halberstadt, Inc. v. Avia Grp. Int'l*, 222 F.3d 951, 956 (Fed. Cir. 2000), the figures in Apple's briefing at the Board were merely illustrative, not intended

to describe a specific convex surface with mathematical precision. Nor did the Board rely on any precise mathematical shape in finding that a POSITA "would have understood that 'Ohsaki's convex cover provides a slight refracting effect, such that ***light rays that otherwise would have missed the detection area*** are instead directed toward that area as they pass through the interface provided by the cover." Appx32 (original emphasis). Such mathematical precision is not required to find that substantial evidence supports the Board's decision. *See In re Warsaw Orthopedic, Inc.*, 832 F.3d 1327, 1332 (Fed. Cir. 2016) (stating the governing law does not require that a reference disclose "dimensions that ***exactly*** meet the limitation" (original emphasis)).

Although Masimo argues (at 45-46) that "specialized education" in optics would have been necessary to understand the "additional light capture theory," Dr. Kenny explained that a POSITA would have been familiar with the "well-known optical principle of reversibility" and with "well-established Snell's law," based on which "a POSITA would have understood that both configurations of LEDs and detectors—i.e., with the LED at the center as in Aizawa or with the detector at the center as in Inokawa—would identically benefit from the enhanced light-gathering ability of a convex lens/protrusion." Appx3607-3612 (¶¶35-45). Moreover, Masimo voluntarily adopted Apple's proposed level of skill, which the Board also adopted. Appx13.

e. Prosecution History Regarding Individual Protrusions Over Individual Detectors Is Irrelevant

Masimo also argues (at 46-47) that "[p]lacing a single protrusion over all detectors would fundamentally disrupt Aizawa's optics by redirecting light centrally and away from the narrow openings." Presumably in support of this argument, Masimo vaguely mentions the prosecution history and contends that the examiner "found individual protrusions over individual detectors did not disclose or suggest Masimo's approach of a single protrusion over multiple detectors." Op.Br. at 48. But this prosecution history is irrelevant—Apple's combinations clearly illustrate that both covers, convex and flat, envelope multiple optical elements. *E.g.*, Appx26. Indeed, Aizawa itself includes a single flat cover over four detectors and one emitter. *See* Appx14-15 (citing Appx2489 (Fig. 1B), Appx2493 (¶¶23-26)). Obviousness does not require showing a motivation to retain claim elements "already present together in a reference." *Gen. Elec.*, 983 F.3d at 1352. The Board's reasonable conclusion that the single flat cover would have been replaced with a single convex cover is eminently clear, e.g., Appx37; Appx41, and, for reasons discussed above, is not inconsistent with Aizawa's photodetectors receiving light.

C. Substantial Evidence Supports the Board's Finding that a POSITA Would Add a Convex Surface for Protection [IPR1713, IPR1716, IPR1733, IPR1737][10]

Although Masimo argues (at 55-56) that Aizawa's flat plate sufficiently protects the sensor components, the Board found that "adding a convex cover, such as that taught by Ohsaki, would also protect the sensor's internal components in a manner similar to Aizawa's flat acrylic plate." Appx49 (citing, e.g., Appx2369-2370 ¶70). This is "simply a case of substituting one known" structure for protecting sensor elements "for another" which "could be interchangeably used," which is independently sufficient to support the Board's motivation-to-combine finding. *Almirall, LLC v. Amneal Pharms. LLC*, 28 F.4th 265, 273-74 (Fed. Cir. 2022).

D. Substantial Evidence Supports the Board's Finding that Particular Protrusion Heights Would Have Been Obvious [IPR1713, IPR1716, IPR1733]

Certain claims at issue in three different IPRs[11] recite specific protrusion height ranges of greater than 1 or 2 millimeters and less than 3 millimeters.

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[10] The Board's analysis of this issue appears at Appx49-50 (IPR1713); Appx142-143 (IPR1716); Appx221-222 (IPR1733); and Appx299-300 (IPR1737). In this section, Apple provides representative citations to IPR1713.

[11] Claims 16, 17 (IPR1713, Appx410-411) of the '564 patent; claims 13, 17, and 29 of the '194 patent (IPR1716, Appx514-515); and claims 9 and 15 of the '195 patent (IPR1733, Appx618-619).

Substantial evidence supports the Board's finding that these protrusion heights would have been obvious.[12]

Although Masimo argues (at 57) that the Board acknowledged that no references expressly teaches the ranges, an express teaching is unnecessary where, as here, there are "a finite number of identified, predictable solutions" to a problem. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007); *Uber Techs., Inc. v. X One, Inc.*, 957 F.3d 1334, 1340 (Fed. Cir. 2020).

Specifically, the Board found "that only a finite number of solutions existed with respect to the height of a convex protrusion on a tissue-facing sensor, which would have met the art-recognized goals of both (1) intimate contact between the sensor's surface and the user and (2) user comfort." Appx55 (citing Appx2545-2546 (¶¶6, 25)). Indeed, Masimo's expert did "not dispute Dr. Kenny's position that there were a finite number of options available for the height of the convex surface." Appx56 (citing Appx5349-5351 (¶¶95-98)). Thus, Dr. Kenny's acknowledgement that Ohsaki does not disclose the size of its components with geometric precision is irrelevant. *Uber Techs.*, 957 F.3d at 1340; *see also, e.g.*, Appx5904-5906 (70:20-72:20); Appx5929 (95:8-18); Appx5939-5940 (105:1-106:5); Appx5945 (111:3-10); Appx5964-5965 (130:13-131:16).

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[12] The Board's analysis of this issue appears at Appx54-57 (IPR1713); Appx148-151 (IPR1716); and Appx225-228 (IPR1733). In this section, Apple provides representative citations to IPR1713.

On appeal, Masimo does not directly challenge the Board's underlying finding that only a finite number of identified, predictable ranges existed for the ***height of the convex surface*** that comfortably makes intimate contact with human flesh; instead it focuses on the general "complexity of designing a physiological sensor" as a whole, Op.Br. at 58, which is unrelated to the Board's finding that these particular height ranges would have been obvious.[13] Moreover, Masimo focuses on an alleged "dramatic" improvement, despite the fact that it did not argue secondary considerations of nonobviousness before the Board. *See infra* Section III.

Dr. Kenny testified that a POSITA "would have found it obvious that a device designed to fit on a user's wrist would be on the order of millimeters" given the practical limits on dimensions based on the intended location for the device's use (wrist) and the scale of the devices described in the evidence before the Board. Appx2425-2426 (¶¶146-147). The level of precision Masimo claims was missing from Dr. Kenny's analysis is not required. *See In re Warsaw Orthopedic*, 832 F.3d at 1332 (stating the governing law does not require that a reference disclose "dimensions that ***exactly*** meet the limitation" (original emphasis)).

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[13] Similarly, Masimo cites Dr. Kenny's deposition testimony discussing the protrusion's ***shape***, Op.Br. at 58 (citing, e.g., Appx5818 (testifying a POSITA would consider routine parameters such as the shape, curvature, length, width, and thickness of a lens to obtain certain optical properties)), which does not pertain to the particular protrusion ***heights*** that a POSITA would have found obvious.

Given this "order of millimeters" scale and the practical limitations Dr. Kenny identified, the Board ultimately credited Dr. Kenny's testimony that protrusion heights in the range of 1 to 3 millimeters would have been obvious "to provide a comfortable cover that prevents slippage." Appx55 (quoting Appx2426 ¶148)). The Board thus offered a reasoned, context-specific analysis, supported by substantial evidence, for its finding about a finite number of design choices that "would have met the art-recognized goals." Appx55.

III. MASIMO PRESENTED NO OBJECTIVE EVIDENCE OF NONOBVIOUSNESS TO THE BOARD

Masimo vaguely suggests that its inventions achieved commercial success, *e.g.*, Op.Br. 2; "unexpected" results, Op.Br. 49, 58-60; or achieved recognition, *e.g.*, Op.Br. 5. However, throughout all four IPRs, Masimo presented no evidence or argument concerning objective evidence of nonobviousness to the Board. Appx12; Appx86; Appx168; Appx243. Because Masimo "did not ask the Board to make any factual determinations" on these issues, this Court should reject Masimo's puffery. *Mobility Workx, LLC v. Unified Patents, LLC*, 15 F.4th 1146, 1152 n.2 (Fed. Cir. 2021).

IV. EVEN IF THIS COURT AGREES WITH MASIMO, REMAND IS THE ONLY OPTION

In IPR1733, Apple also challenged claims 1-17 under Section 103 with references Aizawa, Mendelson-2003, Ohsaki, Goldsmith, and Ali. Appx230.

Because the Board concluded these claims were unpatentable on other grounds, it did not reach the merits of that ground. *Id.* Even if this Court finds the Board's decisions raised on appeal are not supported by substantial evidence, it cannot reverse as to IPR1733. Instead, it must remand for the Board to reach additional grounds it has not yet considered.

CONCLUSION

For at least the foregoing reasons, Apple respectfully requests that this Court affirm the judgement of the Board.

Dated: February 21, 2023

Respectfully submitted,

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CERTIFICATE OF SERVICE AND FILING

I certify that on February 21, 2023, I electronically filed the foregoing **RESPONSE BRIEF** of appellee using the Court's CM/ECF filing system. Counsel for appellant were electronically served by and through the Court's CM/ECF filing system per Fed. R. App. P. 25 and Fed. Cir. R. 25(e).

/s/ Lauren A. Degnan
Lauren A. Degnan

CERTIFICATE OF COMPLIANCE

The **RESPONSE BRIEF** of appellee is submitted in accordance with the type-volume limitation of Fed. Cir. R. 32(b). The brief contains 9,563 words, excluding the parts of the brief exempted by Fed. R. App. P. 32(f) and Fed. Cir. R. 32(b)(2). This brief has been prepared in a proportionally spaced typeface using Microsoft Word 2016 in Times New Roman, 14 Point.

Dated: February 21, 2023

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